THE VETERINARY JOURNAL

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EDITORIAL

ANIMAL HEALTH

In view of the stress being laid on the necessity for a sound agricultural policy in different parts of the world, attention should be directed to the part to be played by the Veterinary Profession in maintaining the health of live-stock, which must form an important part of any general scheme. Not only in agriculture are live stock of importance, but they must occupy a vital place in the nutrition of the human population. It seems evident that the general plane of nutrition should be raised in order that an adequate diet may be provided for all: live stock, especially the dairy cow, will be essential in order to meet this demand. The maintenance of healthy animals is essentially the work for which the Veterinary Profession is fitted by its training and experience. The profession in most countries is even now applying its knowledge to a marked extent, but we sometimes wonder if the lines on which we are working are yielding the best possible results. Science has added to our knowledge of the normal and abnormal and it is our duty to ensure that any observation or discovery made by workers in any of the various branches of Science is examined with a view to its application in the control of health and disease of live stock. Much has been gained by such applications; more will be forth-coming if we continue to use the results of scientific research. We have little to fear in the future if collaborative effort is maintained.

There is, however, some considerable need for the carrying into effect of the most modern proved methods of health and disease control. Schemes have been devised and are in operation whereby new knowledge is disseminated. Lack of progress seems to be bound up to a large extent with lack of knowledge on the part of owners of live stock and their failure to appreciate that means are available to conserve the health of their animals. It seems essential that consideration should be given now to the evolving of schemes whereby (a) every

available bit of scientific knowledge receives careful examination in order to ascertain in how far it can be applied to animal health and disease problems; (b) means can be adopted for the application of the most satisfactory modern methods of the practice of preventive medicine; and (c) the education of live stock owners to appreciate that methods are available and will be increased so that animals will be maintained in a healthier state and in more economic production. The present schemes should be carried further.

THE HONOURS LIST

FROM time to time honours are bestowed on members of the Veterinary Profession. We note with much pleasure and satisfaction that, in the Birthday Honours List of June 2, the award of Knighthood has been given to Mr. D. A. E. Cabot, Chief Veterinary Officer to the Ministry of Agriculture. We hasten to congratulate Mr. Cabot on this honour and to express the hope that he will soon recover from the effects of his accident and be restored to health to enjoy the honour for many years to come. Mr. Cabot's professional life has been largely spent in the Ministry of Agriculture and it is fitting and gratifying that the services he has rendered to the country should be so appreciated and recognised. The whole profession will share the glory of the honour with him, for, in honouring Mr. Cabot, the profession feels that its value and worth will have also been recognised. The bestowal of such an honour will be a stimulus to the profession to go forward with renewed courage and strength.

NEW PRESIDENT, R.C.V.S.

WILLIAM NAIRN, Blairgowrie, has been elected President of the Royal College of Veterinary Surgeons. We know of no man more worthy to receive this high honour and our heartfelt congratulations go out to him. William Nairn is a practitioner of high standing in the Veterinary Profession. Those of us who have been privileged to know him over a period of years have long ago learned to appreciate his sterling qualities as a veterinary surgeon and as a man. His valuable work in many spheres of the profession are too well known to need comment. The Veterinary Profession is recognised as an important body in this and other countries; its influence and work in agriculture is of paramount importance and its duties are increasing year by year. We are passing through anxious times. With a man of such sterling qualities as William Nairn at our head we have little to fear: we shall gain and not lose from his guidance. Our best wishes accompany him in the task that lies before him.

XUM

General Articles

NOTES ON RABIES, ANTHRAX, TABANIDÆ AND FOOT-AND-MOUTH DISEASE

By H. E. CROSS, A.Sc.D.V.H., M.R.C.V.S.,
Goffs Oak

It is with some diffidence that I write these few notes relating a few of my personal experiences with some of the diseases with which I had to deal during my career in India, Egypt, and other countries abroad. I am not a keen writer and some of the conclusions at which I have arrived may not agree with views of others. My views are based, however, on many years of experience and they are not drawn from orthodox text-book teachings; indeed, much of my material is first-hand or personal.

It has been my lot to spend many years abroad, for the most part in India. The problems which confront one in such service are often peculiar to the particular territory where one may be posted. Text-books do not satisfy completely one's desires and it has been my wont to fill in the blank spaces by a close study of the local conditions and to make as full use as was possible of the heterogeneous assortment of practical information which one can cull from the local inhabitants and those with specialised practical knowledge or lore.

Rabies

Of all diseases that I have come in contact with, I know of none in which the symptoms in the early stages vary so much (except in one particular, viz., the peculiar look in the eye). In the final stages of the disease the symptoms are very definite, namely, those of the dumb form and those of the furious form; any text-book gives these in detail.

Rabies in the Dog

One afternoon I was going out for a ride when I noticed a "village" dog "lobbing along" the main road. I suspected it was a case of rabies so I decided to follow him and note what he did. He travelled about twelve miles, passing near several villages and finally landing up in the bazaar, not far from my bungalow—it so happened that his owner (or so-called owner, as a village dog has really no owner though they usually attach themselves to some man or boy and accompany them when they go out to graze their cattle or cultivate their land) was sitting in the bazaar and the dog made his way to him and acted quite normally. While following the dog through the villages I saw him bite a number of dogs (a mad dog does not have a stand-up fight but simply gives a bite and then clears off to bite another dog or continue on his way). The following day this dog developed symptoms of the furious form and was destroyed. When this dog returned to his owner in the bazaar I stated he acted quite normally, but as I watched him I noticed the peculiar look in his eye that is seen in all cases of rabies—it is difficult to describe this appearance and the best I can do in the way of description is to say it is a "glassy eye," showing signs of great pain or fear.

Although this dog had bitten a number of dogs in his chukker round, more cases than usual of rabid dogs did not appear in the neighbourhood.

Not many miles from Jhelum is a village called Dina, where there is a fakir's tomb; it is said that if a person or animal bitten by a mad dog is given a little earth from the tomb he will not develop the disease. I have known many zamindars (farmers) whose animals have been bitten by mad dogs take them to the tomb and force some of the earth from around the tomb down their throats; also it is a common practice for people who have been bitten by a mad dog to eat the earth from the tomb. Their faith in the "cure" is absolute.

Rabies in the Horse

A zamindar brought a nice three-quarter-bred yearling to me for treatment; the horse showed slight colicky symptoms. I was accompanied by my assistant, Abdulla Khan (who, I might mention, was one of the most competent veterinary surgeons I have ever come across). At this time I had very little practical experience of rabies though I was familiar with all that was written about the disease in text-books.

I was approaching the horse with the object of looking at the mucous membrane of the eye when Abdulla Khan said: "Sahib, don't go near that horse yet, I'd like to ask the owner a few questions." It turned out that a mad dog had bitten several horses and cattle belonging to this farmer. He had taken them to the fakir's tomb and given them some of the earth, but one cow had become rabid, and this horse was ill and finally became rabid and was destroyed. The owner believed that his other animals that had been bitten had been cured by the earth from the Fakir's tomb.

When I asked Abdulla what made him suspect rabies he replied: "The peculiar look of the eye"—all rabid animals have the same look.

Rabies in a Mule

I was asked by a veterinary surgeon to look at a mule which was off his feed and he could not make out what was wrong with him. When I saw the animal he was walking round and round the box and showed no other symptoms; however, I noticed the peculiar appearance of the eye so common in rabies and I told the veterinary surgeon that I thought it was a case of rabies—and such it turned out to be.

Rabies in Dogs

During tea with some friends my hostess remarked that she was very pleased her dog had suddenly become friendly with strangers instead of being inclined to be somewhat savage. The owner was recommended to have the dog tied up and kept under observation for a few days. The dog turned out to be rabid.

Rabies in Jackals

Anybody who has lived in country areas of the East knows that rabies occurs amongst jackals—when you are "a new chum" your servants will tell you that there is a mad jackal about—how do they know? It is quite simple: a mad jackal gives a peculiar howl, quite different from a healthy jackal or

a female on heat; it has a much higher pitch and after a time is easily recognised. Now, when a jackal becomes infected with rabies it is not unreasonable to suppose that he will bite a number of other jackals and the disease should spread rapidly and in a few years no jackals would be left alive, but such is not the case, the country districts are still teeming with them.

If you are in a district where rabies is prevalent, always be careful when handling dogs brought for treatment and don't take for absolute truth all that the owner tells you. I remember a lady bringing me a little pet dog for treatment, it was carried by the maid; while I was questioning the owner the maid moved one hand and I noticed the dog snapped at it. I had been watching the dog the whole time I was questioning the owner and from the look of the eye had come to the conclusion that the dog was in the early stages of rabies. When I asked the owner whether the dog was in the habit of snapping at people she replied: "Oh, yes, sometimes—but that's nothing." I held a small stick near the animal and he immediately snapped at it. Within a few days it developed the furious form of rabies.

Whilst one should exercise all due care in the examination of strange animals one should beware of the dangers of "spot diagnosis," as the following incident will show.

A man brought a Great Dane for treatment, with the history that the animal had eaten nothing for two days. At the time I saw it, it was dribbling saliva and I diagnosed dumb rabies—after a short time it was discovered that a bone had stuck in the dog's teeth which prevented him from eating and caused the salivation—I had made a bad mistake. A "lightning diagnosis" often leads one into trouble, as I have found more than once.

Rabies in the Buffalo

I was asked by a zamindar in India to shoot a buffalo that had been bitten by a mad dog and had gone mad. I found the buffalo tied to a tree by a chain; the beast did nothing but butt the tree continuously with her head, there were no other symptoms. Previous to becoming rabid she had been a very quiet, gentle animal.

In districts where rabies was prevalent I always made a point before examining a dog to:—

(1) dip my hands in an antiseptic solution;
(2) to test the dog for biting, by holding a stick near the mouth;
(3) to place some water and chopped meat in front of the dog.

If the dog snaps at the stick or attempts to drink or eat the meat, but is unable to do so (even if there is no salivation) be on your guard for rabies.

As a safeguard, in all suspicious cases keep the animal under observation for fourteen days.

My experience of rabies leads me to the conclusion that though many animals may be bitten by a mad dog very few become rabid. Were this not so there would not be a single village dog or jackal alive to-day in India or Egypt, nor would natives still take animals to the Fakir's tomb at Dina to be cured by giving them earth from the tomb to eat. But do not run away with the idea that you can take any liberties with the disease, you may be the unlucky one

to become infected, and I can assure you it is a horrible disease to get, as you will readily agree if you ever see a person suffering from it.

Anthrax

Many years ago I was working on a ranch where anthrax was fairly prevalent. This prevalence was brought about in this way: there had been an odd case or two amongst the cattle and it had been the practice to inoculate the herd by Pasteur's method, which, as is well known, consists of two inoculations, the second being given ten to fourteen days after the first. This entailed rounding-up some thousands of cattle twice. Not only does this necessitate a lot of time and work but causes the animals to lose condition. To avoid rounding-up the animals twice it was suggested that if Chauveau's vaccine were used it would entail only one inoculation and consequently would only necessitate one rounding-up of the cattle. It was therefore decided to adopt Chauveau's method, and as the animals were heavily infected with ticks, to swim them through the dip immediately after inoculation.

In this district there were no trees, only a great area of flat prairie with streams running through it, and though hot in the day-time it was cold at night. To make a long story short, after the animals had been inoculated by Chauveau's method and passed through the dip the number of cases of anthrax greatly increased. Owing to the dipping and the cold the vitality of the animals was reduced, and owing to the vaccine not being greatly attenuated some of the animals developed anthrax. In anthrax the temperature rises very considerably, the animals become thirsty and make for water and are often found dead in the stream. In cases of anthrax there is a discharge of blood, after death, from the natural orifices, and once the bacillus is exposed to air it sporulates; these spores are very resistant and are not easily killed. In this case the spores were carried along in the slowly running water and some of the other animals coming to drink swallowed the spores and developed the disease and thus the disease spread.

I have mentioned the above experience because it shows that if you are dealing with an attenuated vaccine you are playing with fire and unless you can keep your inoculated animals under proper conditions, by which I mean that there is no chance of their vitality being lowered, accidents are bound to occur.

Tabanidæ

Some young veterinary surgeons may go abroad and may take up work with tabanidæ; the difficulties that I met with and how they were overcome may be of some interest to them.

When I had to carry out some experiments with tabanidæ it took me some months to discover how to keep them alive—in those days there was precious little written about tabanidæ in text-books; probably, to-day, detailed information is given. After many months of trial I found that tabanidæ cannot stand a draught or wind; they will die if not protected from wind. After mastering the technique of being able to keep them alive, my next difficulty was that when I put them on a rabbit or guinea pig (the hair on a small area having been

shaved) for a meal, they would not always suck blood. I finally found that if the shaven skin were slightly damped with water they would readily bite and suck blood; I also found that if the skin were damped too much they would suck up the moisture and not suck blood. You can always tell when they have had a meal by seeing a drop of blood on the skin where they have been placed. The best way to keep the flies is in a case formed of a framework of light wood covered with mosquito netting, one side of netting being open at the centre so that you can put your hand in to catch the flies. When you withdraw your hand the ends of the netting are tied with string. When you want to replace the flies you undo the string and put your hand into the cage, the netting is then tied up again. A small quantity of green leaves should be placed in the case and a few pieces of thin sticks, and at the bottom of the case a little earth is placed.

To feed the flies on your experimental animal the fly is put into a small, thin glass beaker and a piece of thin cardboard put on top; the beaker is turned upside down and placed on the area of the skin of the rabbit that has been shaved and damped, and the cardboard gently withdrawn. When the fly has finished his meal the glass beaker is slightly raised at one side and the cardboard inserted underneath. The beaker is then placed in the case through the hole in the netting, the fly released, the beaker withdrawn, and the hole in the netting tied up.

The First Stage of the Camel Botfly Larvæ

As is well known, the camel botfly lays a living larva in the nostrils of the camel. To find this larva in the mucous membrane of the nostril is practically impossible, but they are easily obtained in the following way. Tie the camels down when the flies are about and you will soon see the flies making for the nostrils of the camel to deposit their larvæ, the camel will try to avoid the fly; if you take a big butterfly-net with a long handle it is quite easy to catch the fly and you then can squeeze out the larvæ into a suitable solution—they are minute, but can be seen easily under a low magnifying glass.

Foot-and-Mouth Disease

Some thousands of cases of foot-and-mouth disease have passed through my hands. From my experience of the disease I have come to the following conclusions:—

(1) Some animals get the disease more than once.

(2) If the disease breaks out amongst (say 50 to 100) animals in a kraal a certain number usually escape.

(3) Cattle kept in loose boxes do not necessarily contract the disease, though in the next box cattle may be suffering from the disease.

(4) In the very early stages of the disease stomatitis may easily be mistaken for foot-and-mouth.

(5) If animals are bought in districts where foot-and-mouth disease is known to exist and they have to be travelled long distances (say 200 to 300 miles) to their destination, although they may show no signs of the disease for several weeks before setting out on their journey, they will develop the disease *en route* if they are travelled long distances daily, are under-fed, and

badly housed at night, if atmospheric conditions are favourable for the disease. As a rule the disease will make its appearance first amongst those animals in poorest condition. If they are well looked after *en route* and only travelled short distances daily they will arrive perfectly healthy.

(6) I am inclined to think that the disease lies dormant in cattle and makes its appearance if atmospheric conditions are favourable to the disease and the vitality of the animal is lowered by any means (e.g., under-feeding, exposure, bad housing, etc.).

(7) A great number of animals suffering from foot-and-mouth disease recover. If the feet are affected treat as you would for an ordinary wound but do not try and treat the lesions of the mouth—allow them to have water tinged pink with permanganate of potash; offer them very watery gruel and chopped, green, fresh grass. Handling the mouth does more harm than good.

(8) I have never seen any evidence amongst the animals that I have had to deal with to make me suspect that birds or rats have had anything to do in the spread of the disease.

ENTROPION IN NEWLY-BORN LAMBS

By J. G. WRIGHT,
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and
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The reference to this condition in pure-bred Oxford Down lambs by J. H. Ellis (1943) prompts us to record our experience of it. The ewes of the flock involved were Border Leicester-Cheviot crosses and the rams used were of the Hampshire Down breed.

1940.—Four rams were used on 98 aged ewes. The rams were purchased from a farm where they were familiar with "eye trouble" in lambs but no details of its incidence were available. Of 151 lambs, 34 (22 per cent.) were affected; in 20 the condition was bilateral.

1941.—A new group of 140 Shearling ewes was introduced. Four new rams were purchased from the same farm as in 1940. Of 162 lambs, 13 (8 per cent.) were affected (5 bilateral).

1942.—The flock comprised 197 ewes; the 1941 group plus 57 additions. Again pedigree Hampshire Down rams were used but they were purchased from a different source from the 1940-41 rams.

In 257 lambs there were 11 cases (4.2 per cent.) (6 bilateral).

1943.—186 ewes (the same as in 1942) : 4 rams from the same farm as 1942.

In 232 lambs 8 (3.4 per cent.) were affected (2 bilateral).

Sex was of no significance in the incidence, and the affected lambs were not weakly. The abnormality developed immediately after birth. On a number of occasions the birth of the lamb was observed and within a minute or so it was noticed that the lid was commencing to roll inwards. The condition was easily corrected by digital manipulation but immediately recurred. In all cases except one the lower lid only was involved, but in the latter case both lids were affected. In 50 per cent. of cases the condition was bilateral. Affected

lambs were readily recognised by the half-closed eyelids and the periorbital wetting. Keratitis developed rapidly, and within twenty-four hours the cornea showed a localised ovoid opacity on its lower segment. A striking feature was the rapidity with which vascularisation of the cornea developed—often within twenty-four hours. At the end of forty-eight hours granulation tissue was present on the affected area. Opacity generally spread until the whole cornea was affected but the vascularisation generally remained localised. Iritis, with accumulation of exudate in the anterior chamber, developed and the condition became acutely painful. There was no tendency to spontaneous resolution and in neglected cases progressive necrosis of the cornea and keratocele were common. Perforation with staphyloma formation, and final breakdown resulting in suppurative panophthalmitis, were also seen.

The results of surgical treatment were striking. In the first eleven cases encountered, excision of an eliptical piece of the skin from the lower lid, followed by suture, was practised. In the remainder the affected lid was everted by the injection into it of liquid paraffin. 100 per cent. success was attained. The inflammation subsided and resolution occurred very rapidly once the source of irritation was removed. In early cases the cornea "cleared" completely. In those cases in which pannus formation was already present, the latter quickly subsided but a variable degree of permanent scarring of the cornea remained. In two neglected unilateral cases in which panophthalmitis had developed, the eyeballs were extirpated. The lambs thrived normally.

One of us (C. F.) observed that affected lambs were born exceptionally "wet." Their fleeces were more slimy and more yellow in colour than normal. In addition, the amount of fœtal fluid appeared to be more copious than normal.

Like Ellis, the writers suspect that the condition is hereditary and transmitted by the ram.

Summary

(1) Entropion in newly-born lambs of Hampshire Down X Border Leicester —Cheviot breed is described.

(2) During the seasons 1940-1943 (inclusive), of 802 lambs 66 (8.2 per cent. were affected. In 50 per cent. the condition was bilateral. In all except one case it was confined to the lower lids.

(3) The course of the resultant keratitis is described and the methods and results of surgical treatment are outlined.

(4) It is suspected that the condition is hereditary and the speculation is made that it is transmitted by the male.

REFERENCE

Ellis, J. H. (1943): *Vet. Record*, Vol. 55, 220.

GLEANINGS OF AN EGYPTIAN ABATTOIR

By M. M. WAHBY, B.Sc.(Lond.), M.R.C.V.S.,
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In the course of my work at the Cairo Abattoir during the period 1939-43, I have been able to compile some interesting records from the great mass of material which has passed through my hands. The following short notes which are culled from these records may be of interest.

(1) Tuberculosis would appear to be very rare in Sudan bulls. Approximately 1 in 1,000 are affected. Post-mortem findings would suggest that once a Sudan bull is infected the disease is one of acute generalisation.

(2) Acid-fast actinomycosis farcinicus bovis is relatively common in Sudan bulls. About 4 per cent. are affected in a mild local form affecting one or more of the main lymph glands, or in a generalised form affecting one or more, or all the internal organs. No bone lesions have been found. The lesions are similar in shape, size, colour consistency and site to those of tuberculosis. Diagnosis can only be confirmed by microscopic examination of smears stained by Topley's modified acid-fast method.

(3) Cysticercus ovis is found occasionally in the heart muscle of camels; on three occasions it has been found in the muscles of the limbs. The camel is an accidental host. It is common to find it in Sudanese sheep. It is rare in Egyptian sheep.

(4) Serpentine pathes due to Cysticercus terricollis under the capsule of the liver are common in Egyptian lambs.

(5) Sarcocystis tenella are very common in Egyptian buffaloes, the most common site being in the œsophagus.

(6) I have found sarcocystis miescheriana on only two occasions in Egyptian pigs.

(7) Fasciola gigantea is the only liver fluke found in Egyptian bovines and sheep. It is very rare in Sudanese bulls. I have found it twice in the liver of the pig.

Fasciola hepatica and dicrocœlium lanceatum are found only in imported Syrian sheep. I have found them on two occasions in the liver of Syrian camels.

(8) Onchocerca gibsoni is common in the cutaneous muscles of Sudanese bulls.

(9) Œsophagostomum columbianum is very common in Sudanese sheep. Together with coccidiosis it is responsible for a great number of deaths.

(10) There is definitely no trichinella spiralis in Egyptian pigs.

(11) I have found severe fatal piroplasmosis in dromedaries.

AN OUTBREAK OF ANTHRAX

By MAJOR C. W. TOWNSEND, T.D., F.R.C.V.S.
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History of Herd

THE affected herd consisted of Friesians and was a tuberculin-tested herd, Previous to this outbreak there had been no recorded cases of anthrax on these premises, and certainly no sudden and suspicious deaths had occurred during the last forty years.

Course of the Outbreak

10/3/41. *Cow No.* 1. 4½-years-old and five months calved. Found dead in the morning, and when seen at 10 a.m. was lying on the right side, and showed neither tympany, blood at the orifices, nor eversion of the rectal mucous membrane.

The only symptoms as recorded by the cowman were that for two days previous to death, this cow had shown a lowered milk yield, inappetence and general dullness.

Blood smears were taken and confirmed as anthrax.

11/3/41. In the morning the temperature of each cow was taken, and cow No. 2 and cow No. 5 each had a temperature of 105 deg. F. per rectum. Two other cows, A and B, had temperatures of 103.5 and all four gave a considerably diminished milk yield at the morning milking.

When seen in the evening cow No. 2, a 4-year-old six-months calved cow, was tucked up in appearance, intermittently straining with arched back, pulse small and rapid, mucous membranes congested, and respirations shallow and rapid.

12/3/41. *Cow. No.* 2 found dead in the morning. Smears were confirmed as anthrax. This carcase was tympanitic, with eversion of the rectal mucous membrane, and it was observed that it is impossible to pack tow and Stockholm tar into the rectum.

13/3/41. *Cow. No.* 3, a 3½-year-old Friesian which had previously shown no symptoms, was found dead.

Smears were confirmed as anthrax.

14/3/41. *Cow No.* 4, a 4-year-old Friesian, two months calved, was found dead.

Smears were confirmed as anthrax.

16/3/41. All bovines on the premises, cows, heifers, calves and bull, were given 10 c.c. of equine anthrax serum subcutaneously (supplied by Ministry of Agriculture).

5/4/41. *Cow No.* 5, a 3-months-old calved cow, which had shown a rise of temperature to 105 deg. F. on 11/3/41, but had apparently been quite normal since, was found dead.

Blood smears were confirmed as anthrax.

9/4/41. *Cow No.* 6, a 3½-year-old cow, was reported to be off her food, with diminution of milk yield.

When seen the cow was showing the "tucked-up" appearance accompanied by frequent straining, similar to that shown by cow No. 2. Fæces, which were passed in small quantities at frequent intervals, were of normal consistency and not blood-stained. The coat was staring with hide-bound skin. Mucous membranes were congested, pulse rapid and shallow, and appetite in abeyance. The temperature per rectum was 106 deg. F. Although dull in appearance this cow was active enough to resent the taking of her temperature. Sweating was not a feature.

This cow was isolated in a loose box away from the herd, and given 100 c.c. equine anthrax serum subcutaneously.

10/4/41. *Cow No.* 6. Little change in appearance, continued inappetence, intermittent straining, pulse small and very rapid, with short, shallow respirations. Temperature, 106 F., and it was necessary to rope the horns before this could be taken.

A further 50 c.c. equine anthrax serum administered subcutaneously.

14/4/41. *Cow No.* 6 found dead. Confirmed as anthrax.

15/4/41. *Cow. No. 7* found dead. Confirmed as anthrax.

Each of the remaining cattle received 10 c.c. equine anthrax serum.

25/4/41. The temperature of each animal having been found normal, every bovine on the premises was given 1 c.c. of anthrax vaccine subcutaneously (supplied by the Ministry of Agriculture).

Some of the calves and three of the cows showed a pronounced local reaction at the site of inoculation, and slight systemic disturbance, within twenty-four hours.

Two of the cows which showed a reaction were cows previously referred to as cows A and B, which had shown a suspicious rise of temperature to 103.5 deg. F. and lowered milk yield, in the initial stages of this outbreak. In each of these two cows, the swelling was hard, painful, circumscribed, adherent to the subcutaneous tissues, and of approximately 20 mm. diameter. In one case the swelling persisted for ten months.

Suspected Anthrax in the Dog on these Premises

Subject: Black Labrador retriever dog, 2 years old. Vaccinated as a puppy against canine distemper.

History

This dog was in the habit of eating a few dairy nuts each morning. (These nuts were suspected of being the source of this infection, and their use was discontinued on 12/3/41.)

14/3/41. The dog was reported as being acutely ill and refusing all food.

15/3/41. When seen on this day was extremely dull and dejected, with constant straining and passage of loose, blood-stained fæces. Mucous membranes were congested, and the temperature per rectum was 106 deg. F. The owner confirmed that the dog was loosing flesh rapidly.

16/3/41. The dog was acutely ill, with a small, weak pulse, and it was not expected that he would live.

Twenty c.c. of equine anthrax serum were given subcutaneously.

18/3/41. The dog was not seen on this date, as it was reported that he was in apparently normal health and had gone out rabbiting.

It is regretted that laboratory confirmation of the diagnosis was not sought, but the chances of the dog's recovery had appeared so remote.

Source of the Infection

Available evidence pointed strongly to the cake being the source of infection, for the following reasons:—

(1) Immediately prior to the outbreak the owner had commenced feeding a new consignment of cake.

(2) Only the cows were infected, and it was only they which had the cake.

(3) The dog was in the habit of helping himself to a few dairy nuts each morning, and had some of the suspected cake. A few days later he was affected with a disease which we believe was anthrax, and certainly the administration of equine anthrax serum appeared to bring about an immediate and striking improvement.

(4) All the foods other than the cake were fed to all the stock at the same time as the cows, but the young stock were not affected.

(5) All the stock were housed indoors at the time and had no contact with the land.

It is of interest to note that in these cases, unless one could produce anthrax spores from the centre of the dairy nuts, it is impossible to place the onus on the cake merchants, as one cannot prove that the cake has not become contaminated with spores during transit from rail trucks, lorries, etc.

Discussion

Points of interest in the outbreak are :—

(1) The fact that the first cow to die suffered from malaise two days previous to death, and showed none of the usual so-called typical features of an anthrax carcase, i.e., tympany, and blood at the orifices.

(2) Cow No. 5 showed a most suspicious rise of temperature to 105 deg. F. on 11/3/41, became normal again, and eventually died of anthrax on 5/4/41.

(3) Two cows, A and B, were regarded with suspicion on 11/3/41 as they both had a temperature of 103.5 deg. F. Both these cows had a pronounced local reaction with some systemic disturbance following the use of anthrax vaccine, suggesting an allergic reaction. Some of the calves also showed a reaction, however.

(4) The most striking feature in cows showing symptoms before death was the intermittent straining and "tucked-up" appearance, with the passage of small quantities of apparently normal fæces. In the dog, however, the straining was accompanied by the passage of blood-stained fæces.

(5) Sweating, a feature formerly recorded in cows showing symptoms of anthrax before death was not noticed to be a feature in this outbreak. (*Chambers' Veterinary Record,* 1942.)

(6) Equine anthrax serum appeared to have a most beneficial effect in the dog.

(7) The use of equine anthrax serum in the bovine in the doses employed was, on the whole, disappointing, as it merely seemed to postpone death by a few days.

(8) Following the use of anthrax vaccine no further cases have occurred on these premises. (May, 1943.)

VETERINARY JURISPRUDENCE—III

By THOMAS LISHMAN, M.R.C.V.S.
Barrister-at-Law, of Gray's Inn

(*Continued from page* 163)

WARRANTIES AND CONDITIONS OF SALE. Veterinary surgeons are frequently required to examine horses for age, soundness, and suitability for work, and what they find amounts to a warranty when it is used as a representation in a contract of sale, or, in other words, a veterinary surgeon's certificate which is used to augment the seller's description of the animal will, unless notification to the contrary is given, amount to a warranty given by the seller.

Warranties and Conditions of Sale are distinctly different terms in a contract, and whether it is one or the other depends solely on what was the intention of the parties at the time the contract was made. In any action on a verbal contract the nature of this intention would be a question of fact to be decided by the jury, whereas in a written contract it would be a question of construction for the decision of the court.

Warranty has been defined as a term of the contract of sale which is collateral to the main purpose of the contract, and by that is meant it is not so vital as to discharge the obligations of the contract if the circumstances are, or become, inconsistent with it. Breach of such warranty gives the right to a purchaser to claim damages, but no right to reject what he has bought.

Condition of Sale. This is not, in any way, collateral to the main purpose of the contract as in the case of warranty, but so much part of the contract itself that if the circumstances are, or become, inconsistent with it, the purchaser may treat all obligations under the contract as discharged and forthwith rescind it.

Illustration of the difference between a Warranty and a Condition of Sale. If, when A is selling a horse to B, he says: "He is a good jumper," and when the animal is put at a jump it is obvious that he has never seen one before, a jury would probably decide that A's remark was a warranty. B would have to keep the animal and sue A for damages, or, if B had not yet paid for it, he could set up the breach of warranty in diminution of the price.

But, supposing B had said: "I do not want the horse unless he is a good jumper," and A had replied: "He is a good jumper," this statement would probably lead the jury to decide that the statement of A was a Condition of Sale. B could then refuse to take the horse, recover the price if he had paid for it, and sue A for damages for breach of contract.

N.B.—There is nothing certain about the above illustration, and it must be considered as nothing more than what a jury would probably decide.

In Scotland a breach of warranty gives to the buyer the same rights as does a breach of contract in England.

A Warranty is a guarantee given by the seller to the buyer that the horse answers the description given of it at the time of the sale.

Express Warranty is a declaration concerning the soundness, age, or suitability of an animal made at the time of the sale, and it is something on which the purchaser is entitled to place reliance. Such statements in a sale catalogue are warranties, and any breach of them entitles the purchaser to seek damages from the seller.

Implied Warranty. This is one where the law raises the implication from the presumed intention of the parties, e.g., if a horse is sold as a hunter it will be implied that it is reasonably fit for that purpose. Of course, there is no implication as to the standard of quality to be expected.

Limited Warranty is where the buyer must object within a limited time, or the animal must be kept with all its faults. Under Tattersall's conditions of sale it is binding on the purchaser to return an animal not answering the warranty within a certain limited time—before 5 p.m. on the second day after the sale, or the purchaser will be barred to any claim for breach of warranty.

If, owing to illness or incapacity, it is impossible to return the animal, and the purchaser notifies to this effect, sending a veterinary surgeon's certificate, within the above time-limit, the fact that the horse is not returned is no bar to a claim for breach of warranty. A question frequently asked is: "Why is it that a horse bought under Tattersall's conditions of sale can be returned if it is found not to correspond with the warranty given of it in the catalogue?" The answer is as pointed out above.

Special Warranty, this a guarantee where some defect is known to both the seller and the buyer, e.g., a horse has a defective hock, and the seller may want to protect himself against consequences that may arise from the defect, or, on the other hand, the purchaser may want to make the seller responsible for such consequences.

General Warranty, e.g., the seller says: "The horse is sound," if found to be unsound, all the buyer has to do is prove that it was unsound when sold.

Qualified Warranty, here the seller says: "The horse is sound to the best of my belief." In this case, as well as proving that the horse was unsound at the time of the sale, the buyer must prove that the seller was aware of the unsoundness.

Like buying anything else on the open market, a man buying a horse without any warranty does so at his own risk. The rule obtaining being the legal maxim of *caveat emptor* (buyer beware). The buyer is expected to keep his eyes open, but with an express warranty he is relieved of this responsibility. But, even a warranty does not extend to cover patent, or obvious defects, and the buyer will be presumed to have bought the animal with full knowledge of such things as an empty eye socket or the absence of a tail. This is a general rule, but it does not apply where there is no opportunity to see the animal, because where one cannot see what one is buying the legal maxim of *caveat emptor* does not apply.

Fraudulent Misrepresentation. This invalidates any contract—warranty or no warranty—and if there is anything of a fraudulent nature, the purchaser can rescind the contract at his option. Examples are: bishoping the teeth, hiding a sandcrack with gutta-percha, painting broken knees, etc. Even if one sold a horse and said it was sold "with all its faults," or "without guarantee," if one deceived a buyer by such methods he can at once rescind the contract of sale. But there must be the bad intention, for no mistake not prompted by a dishonest intention is fraud.

Warranted free from Vice. A horse sold with this warranty will not answer it if he is affected with any of the following: biting, bolting, crib-biting, kicking, striking, rearing, jibbing, backing, shying, windsucking, weaving, and perhaps others such as incessant fretfulness, bolting food, refusal to lie down, unreformable rolling in stables, and any other bad habit that would make him less tractable, impair his health, or render him dangerous.

Vice is not an unsoundness unless it actually does, or in its ordinary progress will, diminish the natural usefulness of the animal so as to make him less capable of work of any description.

(*Concluded*)

PARASITIC OTITIS IN THE DOG

By EDGAR von LUSTIG-LENDVA, M.A., M.R.C.V.S.,
Hendon

It is sometimes stated the parasitic otitis does not occur in the dog. In connection with this the following case may be of interest to the profession:

Scottish terrier male, seven years old, was brought to my surgery for destruction, as the dog had been treated unsuccessfully for "canker" for a period of twelve months. Examination by auroscope and microscopically revealed otodectes cynotus. (The dog was friendly with a cat!)

Both ears were treated with odylen and benzyl-benzoate, every third day, and released as cured after four treatments. Subsequent examination showed no recurrence of the otitis.

MULTIPLE SARCOMATOSIS IN SPANIEL BITCH

Subject: A golden spaniel bitch, aged six years. It was brought to my surgery on account of some round raised purplish lesions on the abdomen and inside the thighs. The lesions had come up within 48 hours. A tentative diagnosis of furunculosis was made and the lesions treated with sulphonamide. Two days later dog was brought back, the skin lesions persisted. Silver nitrate-Balsam of Peru ointment was prescribed. A week later the dog was brought back again. There was marked dyspnœa and multiple nodular swellings on the mucous membranes of the cheek and throat. The animal was taken to the Royal Veterinary College, as some fungus disease was suspected and an exact diagnosis was desired.

Diagnosis of multiple sarcomatosis was made and a lesion removed and sent to the pathological department of the College for confirmation. Within 24 hours after the removal of the lesion, whilst waiting for the diagnosis, approximately thirty new tumours appeared on the back and on the head of the animal. Breathing eased through the enforced rest. No change was observed in the appearance of the tumours. Animal destroyed after the clinical diagnosis had been verified. No primary growth was identified.

RUPTURE OF HORSE'S SPLEEN BY A KICK

By ALFRED SAVAGE, D.V.M., M.R.C.V.S.,
Department of Agriculture, Vet. Laboratory, University of Manitoba, Winnipeg

The following note was found among others made during the first Great War. Even after twenty-five years it seems sufficiently unusual and dramatic to warrant its being recorded.

An unclipped, aged, L.D. bay gelding 15.3 in. standing in the picket lines, was kicked vigorously on the ribs by both hind feet of his left-hand neighbour. He broke his halter, squealed, and backed out of the line. He stopped, breathed quickly for a few minutes, staggered and braced himself, then collapsed in a heap and died. Time, 3 a.m., December 27, 1916.

Post-mortem examination, seven hours later, revealed a bloated carcase with blanched mucosæ but no external signs of violence. There was no *subcutaneous* evidence of contusion! The *internal* surface of the parietes at arch of 16th to 18th ribs appeared to have been bruised. Abdominal cavity largely filled

with blood and clots that had settled around the sternal flexure of the colon. Omentum hæmorrhagic. Otherwise the only abnormality was confined to the spleen.

That organ was unusually large. Near its base on the *external* surface was a circular contused area about 4 in. in diameter. Immediately opposite to this, on the *internal* surface, there was a transverse rupture 4 in. long and almost immediately below it another one half that size.

The animal that delivered the fatal kick was shod all round with old, flat shoes that needed renewing.

Comment seems futile. Even so it should be added that subsequent experience and extensive contacts with practitioners in a country where horses are not noted for good manners, have not brought a similar incident to light. In volume III of Hutyra & Marek's third (English) edition there is the remark: "A healthy spleen only very rarely tears from direct injury. . . ." To this I add the geometrical Q.E.D.!

ASCARIDES IN THE PIG: INTERESTING SEQUELÆ

By DONALD HERBERT ALDIS, M.R.C.V.S., D.V.S.M.,
Dunmow

Subject.—A 14-week-old castrated boar pig in good condition similar to its fellows.

History.—Quite well on Saturday, off feed on Sunday, dead on Monday.

Post-mortem.—Complete adhesion of stomach and liver wherever adjacent, and hæmorrhagic enteritis.

The small intestine passed through a tear in the mesentery and apparently had been partially strangulated for some time for scar tissue had formed in the narrow part of the bowel and at the rent in the mesentery.

The stomach contained a few ascarides. The bile ducts in the liver, the dilated and inflamed gall bladder, the bile duct, the duodenum and the intestine as far as the strangulated partem were crammed with ascarides.

When removed the liver and the stomach had the appearance of a single organ. The liver was thickened and its free edge shrunken until it looked like a protuberance on the front of the stomach. The liver substance was somewhat softer than normal. It would appear that the occlusion of the bowel drove the worms (almost mechanically) to their invasion of the liver via the bile duct.

DUNG AND DROPLETS

By TOM HARE, M.D., B.V.Sc., M.R.C.V.S.

MANY infections of cattle and sheep are spread by dung. What is their incidence, and does it vary directly as the density of the stock? What loss by wastage and death do they cause annually? There appear to be no authoritative statistics by which we can measure the gravity of these questions. Even approximate figures would be helpful. My 1941 and 1942 dung tests of 119

infected herds of cattle showed worm infections in 52 per cent., coccidiosis in 31 per cent., and Johne's disease in 17 per cent., while the tests of 73 infected flocks (33 of sheep and 40 of goats) revealed worm infections in 63 per cent. and coccidiosis in 37 per cent. By grouping such relative results from other veterinary laboratories and then surveying the incidence of one infection (e.g., coccidiosis) in a few sample areas, approximate figures for the whole country could be calculated.

The aim of treatment is to restore the animal's health, to destroy the parasites and to limit the range of their vectors; but there are limitations to its achievement. Thirty years ago, as a pupil to the late Charles Hartley, of Lincoln, I was taught to treat worms in cattle with powders of antim. pot. tart. and ferri. sulph. This was replaced by nicotine sulph. and cupri. sulph., which in turn is being supplanted by phenothiazine. For coccidiosis I still adhere to the daily dose for twelve days of pulv. ipecac. co., with a week's rest from the drug followed by a second twelve-day course. For lungworms in cattle and sheep I advise nicotine-copper-sulphate or phenothiazine coupled with a course of Barker's vaccine.

Excluding the specific treatments for clostridium and salmonella infections, we seem to have made but slight progress in the curative treatment of dung-spread parasites. Our medicinal and dietary measures are merely alleviatives. The best of them may contribute to the evacuation of the parasites and to the patient's well-being, but they do not destroy all the parasites. Secondly, in order to prevent reinfection, an essential adjunct to curative remedies is the daily removal of the patient's dung. This laborious measure leads to the problem of dung disposal on the farm, which in turn depends upon the period over which parasites remain infectious in the dung. There is surprisingly little precise knowledge as to the duration of viability of parasites in dung. Coccidia may remain alive for some eighteen months; T.B. (in culture) can live for a few months up to three or more years; members of the clostridium group live as spores in culture for months and in dust for years. In my opinion, infected dung should be isolated for at least two years.

I use the term "isolation" advisedly. How else can infected dung be rendered safe? Small quantities can be incinerated; given suitable machinery large quantities might be sterilised by heat on the principle of drying poultry-dung. But treated dung would not make good manure. Husbandry requires the *conservation* of dung. Is it practicable to call upon farmers to isolate infected dung for two years? Though we tell them the dangers of mucking infected dung on to pasture or leys which are to be grazed or mown within the two years' isolation period many prefer to use fresh dung; and I suppose they are right. But they leave us on the horns of the dilemma.

We all adhere to the long-established veterinary teaching that any one species of grazing-stock as a crop should be moved over the farm on a three- (or more) year rotation; and we welcome as a very valuable ally to our teaching Sir George Stapledon's work on grassland improvement by means of the plough. But the success of rotation-grazing as a preventive depends upon how long a species grazes its own dung; and that period is determined by the ecology of the dung-spread parasites. The isolation of the dung of infected grazing-stock is possible

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by daily tethering or folding on patches of clean pasture or leys. But whatever folding system proved adaptable to ploughable land convenient to the homestead it would not be practicable on distant land, estuaries, hill-grazings, etc., which seem doomed to a bowel to mouth existence.

The third hindrance to progress in curative treatment is our inadequate knowledge of the ecology of dung-spread parasites and of their vectors. This vast problem, requiring precise measurements of many factors, climate, nutrition, land-drainage, quality of soils, etc., is being tackled energetically by Dr. E. L. Taylor, whose work we all follow with deep interest and gratitude.

To me there appear three essentials for a preventive policy: the stock should be periodically examined by the veterinary practitioner; all new purchases should be quarantined until they have been declared healthy; and the veterinary examinations should include adequate laboratory tests. Ultimately the scope and efficacy of any preventive system which we devise are determined by John Bull himself. To carry him with us he must be enabled to compute by how much the profit from dung as muck is offset by the loss from dung as pollution, also the probable influence on the farm accounts of adequate veterinary curative and preventive measures. And for this information we require answers to the questions with which I opened this paper.

As aids to diagnosis and treatment, practitioners send "milk" (mammary-gland exudate) for laboratory examination; less commonly they send exudates from the uterus, inflamed joints or abscesses; only rarely do they send droplets from the throat. What significance do practitioners attach to the pathologist's report on a "milk" as streptococcal mastitis? To me it is something much more than a cow with a local infection of the udder; it is something endemic and potentially epidemic. Here are two of my records from "mastitis"-infected herds. For a period calves died within a few days of their birth; the viscera of one was sent to me; I isolated the streptococcus from the lungs and spleen and reported that the calf died of the streptococcal infection. The practitioner then sent the dam's "milk," which produced the same group D streptococcus. On another infected farm two out of a bunch of steers developed swollen glands of the neck from which the pus produced the group B streptococcus in pure culture. Later on that bunch of steers developed husk; one died and I received its lungs, which I reported as lungworm with streptococcal pneumonia. Such experiences are not unconnected events. I am persuaded that they are expressions of the streptococcal infection, waxing and waning, but ever-present in the herd.

As I understand it, the first phase of the streptococcal infection is the settlement of the microbes in the throat, in the mucus of which they may lie dormant or rapidly multiply, producing toxin or invading the tissues via the lymphatic system, the tissue spaces or the blood. Should the invasion be via the blood-stream the streptococci may be carried passively without obvious clinical signs, or if actively multiplying, signs of septicæmia are observed. This second phase of invasion merges into the third phase of localisation, in which the streptococci settle in and damage one or more organs. Here they may remain a pure infection or they may be replaced or overgrown by secondary microbes such as staphylococcus or B. pyogenes. In these so-called "predilection seats" (organs which have been subjected to stress, such as strained joint-capsules or tendon-sheaths,

a lung damaged by worms, a post-parturient uterus, the mammary gland of a man-milked animal) the streptococci produce such local lesions as arthritis, pneumonia, metritis, mastitis, abscesses, impetigo of the teat (false cowpox), and so forth. To my mind streptococcal mastitis is a local expression of a generalised infection, which began in the throat.

If the laboratory examination of a "milk" reveals streptococcal mastitis I should accept the streptococcus as the initial infecting microbe; on the other hand, if it revealed mastitis due to staphylococcus or B. pyogenes I should not accept these microbes as other than secondary invaders and I should search the herd for the primary infection. I adopt a similar attitude to my finding, say, staphylococcus or B. pyogenes in the vaginal exudates of metritis cases, and I counsel search of the patient and in-contacts for such microbes as Brucella abortus and streptococcus. In the beta hæmolytic streptococcus infection of dogs, horses and other animals, I frequently find that the microbe isolated from the local lesion of the third phase is other than the B.H.S. There has formed in my mind an order of precedence for the bovine microbes which are more commonly met with in country practice. I picture streptococcus, Br. abortus, T.B., the clostridium group and the salmonellas as the primary infectors having epidemic potentialities, whereas I see staphylococcus, B. Pyogenes and Past. bovis usually behaving as secondary invaders. I do not overlook the injurious and invasive properties of these secondary microbes of which we have a good naked-eye demonstration in the staphylococcal folliculitis which sometimes complicates streptococcal infection. Neither do I overlook the need for specific measures in their treatment. My arbitrary classification should not be driven too far; it illustrates my theme that we should look beyond the patient to the herd for our diagnosis.

Diagnosis of the typical syndromes of the streptococcal infection may give little difficulty to the experienced practitioner, but atypical cases and carriers are likely to be overlooked even though the herd's "milks" have been tested. Without assuming the existence of streptococcal carriers in cattle I have been unable to visualise and to explain to my practitioner colleague the process of various streptococcal epidemics, which I have studied in consultation. By analogy with dogs I should expect the bovine streptococcus to be resident within the mucus covering the throat, vagina or prepuce. But so far a satisfactory method of tonsil-swabbing cattle and horses has eluded me. I demand a high standard of my technique, viz., that the operator shall obtain a clear view in order to sweep the swab over the surface of one tonsil and to withdraw it without allowing it to touch any other tissue. I have obtained the throat mucus of cattle diluted with saliva or nasal excretion either by inducing the animal to cough on to a Petri dish or by swabbing the nasal mucosa, but with very few exceptions these attempts have given unsatisfactory cultures. My experience of vaginal-swabbing cattle is too meagre and I have not swabbed the prepuce. I hope Dr. Stableforth, for whose work on the bovine streptococci we are deeply grateful, may be persuaded to investigate the bacteriology of the bovine throat and the carrier problem. What is the streptococcal carrier rate; is it determined by the closeness of contact; is the carrier constantly or intermittently infectious? The findings of such studies will exert a profound influence upon our treatment of bovine streptococcal infection.

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Mastitis will serve for a brief commentary on the curative and preventive treatment of bovine streptococcal infection. For us, as for our ancestors, there is one cardinal alleviative: wherever pus has formed evacuate it. From the udder the exudate is usually evacuated by stripping; the more often the teats are drawn the better for the patient. Alternatively there is the old-time procedure of having the patient suckled by a calf. Provided it is more than seven to ten days old the calf does not appear to take harm; but not infrequently I have found fatal streptococcal septicæmia in calves aged one to four days which have been suckling cows affected with streptococcal mastitis. I have found it in the patient's calf and in the fostered calf; also in either whether they have or have not suckled the colostrum. From the fact that by rearing the baby calves on boiled milk, with no harm resulting to the calf, one might infer that the infection was conveyed by the patient's milk and not by her droplets; but the problem needs investigation. Any favourable result of udder irrigation is due, in my opinion, not to the particular antiseptic but to the flushing of the udder's drainage system.

My observations do not support the view that sulphonamides are a curative of streptococcal mastitis. It would seem that the powerful bacteriostatic action of the sulphonamides in maximum dosage is exerted on the microbes in the blood-stream, not on those localised to such tissues as the mammary gland. It is recognised that temporary clinical alleviation usually follows upon the administration of sulphonamides to the acute febrile mastitis patient, but the drug does not destroy the streptococci in the tissues; that is the function of the patient's humoral resistance. Professor Fleming, the eminent lieutenant of Sir Almroth Wright, has shown that as a consequence of simultaneously administering vaccine and sulphonamide both bacteriolysis and bacteriostasis are enhanced. Fleming's phenomenon of synergism operates in cases of canine acute B.H.S. infection (puerperal sepsis), but of its value in cattle I have insufficient data.

I firmly believe that vaccine therapy is the most effective available stimulant of the humoral resistance to the streptococcus. I offer the following advice to practitioners who consult me on the use of my bovine mastitis formalised vaccine. In view of the contagiousness of the infection treatment should embrace the herd and all new purchases. Secondly, the vaccine should be autogenous and should include the staphylococcus and/or B. pyogenes as revealed by the "milk" tests. Thirdly, none of our animals acquire a durable resistance to the streptococcus; the resistance appears to wane within about six months of vaccination; consequently, the course of vaccine should be repeated at intervals not exceeding six months. During the first year, herds with an incidence of about 33 per cent. or over should be revaccinated at three-monthly intervals. Failure to appreciate the significance of this waning resistance may account for many who have questioned the efficacy of vaccine therapy. One course makes little, if any, impression. In my experience of vaccine therapy the incidence is usually down to about 10 per cent., sometimes to 5 per cent., by the end of the second year; in the smallest category are the "failures" from which no improvement is reported. I wish I had more facilities for investigation of the "failures" in the field; from the little I have been able to do I have the impression that

a high incidence of carriers is at the root of the problem. Having consistently failed to find a method of destroying the B.H.S. resident in the surface mucus of "carrier"-dogs I have nothing more to add to my story.

Though I have sounded notes of frustration my theme may encourage some to seek the way through the carrier problem by intensified clinical study and the testing of dung and droplets. We should be hopeful. Through many years our profession has climbed to a wider perspective of its art and science. Now, as we gaze outwards, the individual elements of the foreground merge imperceptibly into the community of the middle-distance, patterned in the lights and shades of epidemiology. And beyond is the opalescent haze of soft mystery to entice the fervour of our successors in the search of the carrier.

N.B.—I confine the cause of bovine streptococcal infection to the strains which group by the Lancefield technique, though they are not invariably hæmolytic.

Abstract of Current Literature

TREATMENT OF MASTITIS WITH TYROTHRICIN*

By F. E. MARTIN,
West Chester, Pa.

STREPTOCOCCIC mastitis was eradicated from a herd of forty-nine Guernsey cows by the use of tyrothricin, in conjunction with repeated microscopic examination of milk specimens from the entire herd.

Diagnosis.—The incubated film technic on individual quarter samples was followed exclusively. Before taking samples, each udder was washed with a sterile cloth wrung out of sodium hypochlorite solution. After discarding the first stream of milk, the sample was drawn into a sterile vial. Vial stoppers were protected from contamination by paper bottle-caps held in place with rubber bands. Each vial contained 0.5 c.c. of equal parts of 0.5 per cent. brom-cresol purple and 1 to 500 sodium azide.(1) These vials were inverted after filling and incubated at 37.5 deg. C. (99.5 deg. F.) for twenty to twenty-four hours. The fermentation reaction was then noted and films were prepared by touching the stopper from an inverted vial to a glass slide. The resulting films were dried, stained with Newman's stain and examined under the oil-immersion lens of the microscope.

At least two positive findings, two weeks apart, were required before a case was diagnosed positive. Likewise, after treatment at least two consecutive negative tests were required, at bi-weekly intervals, before the case was classed as cured. The entire herd was examined monthly during the period under observation. Affected cows were examined one to three times between monthly examinations.

Therapy.—Following complete milking of an infected quarter the udder was washed with a sterile cloth wrung out of hypochlorite solution. The end of the teat was again cleansed with a pledget of sterile cotton dampened with rubbing alcohol. A glass syringe with a blunt cannula was used to inject 20

* *Vety. Medicine*: Vol. xxxviii, No. 5, May, 1943.

to 50 c.c. of a mineral oil emulsion containing 2 mg. of tyrothricin* per cubic centimetre (a clean, sterile cannula was used for each quarter treated). The quarters were massaged gently, following the injection, in an effort to distribute the emulsion over the internal surface of the cistern and also over the surface of the sinuses emptying into the cistern.

The milk was discarded at the next regular milking. Subsequent milkings were used to feed calves until the milk returned to normal in appearance, which was usually on the third to the sixth day following treatment. By treating only enough cows at a time to furnish the milk required by the calves, very little disturbance occurred in the output of market milk. A week later, individual quarter samples were again examined and treatment was repeated on such as were positive. In refractory cases, the weekly examinations and treatments were continued into the dry period, resulting in cures of some apparently hopeless cases.

Results.—Streptococci were recovered from the milk of twelve cows in this herd of forty-nine; a total of thirty quarters being infected. Nine of these cows became negative to this organism following one to nine injections of emulsion of tyrothricin, in doses ranging from 20 to 50 c.c. Recoveries followed an average of 2.6 injections.

Summary and Conclusions.—In a herd of forty-nine cows, twelve were found to be shedding long-chain streptococci from thirty quarters. Diagnosis was made by microscopic examination of films of incubated milk from individual quarters. Treatment consisted of instilling an emulsion of tyrothricin in mineral oil into the infected quarters and repeating as indicated by the results of re-examinations.

Of the eleven cows treated nine (82 per cent.) were cured; of the twenty-six quarters, twenty (77 per cent.) were cured. Two cases were dismissed as incurable. The number of treatments required varied from one to nine (average 2.6), in doses ranging from 20 to 50 c.c.

REFERENCE

(1) Little, R. B., Dubos, R. J., and Hotchkiss, R. D. (1941): "Gramicidin, novoxil and acriflavine for the treatment of the chronic form of streptococcic mastitis." *Jnl. A.V.M.A.*, 98: 3, pp. 189-199.

Correspondence

To the Editor, THE VETERINARY JOURNAL.

The Origin and Spread of Infection

SIR,—Your Editorial (V.J., May) was most instructive, and your reference to foot and mouth disease most interesting. Our colleagues on the Continent of America are greatly amused about the theory of birds acting as carriers of this particular disease. This hypothesis has been abolished completely from their minds. What better proof do they need than two Republics, kept free of foot and mouth disease, adjoining other Republics where the disease is so prevalent as to be considered beyond control. Due to geographical formation,

*The emulsion of tyrothricin was furnished gratuitously by the Pitman-Moore Co., Indianapolis, Ind., for investigational use.

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a kind of no man's land, the cattle in the infectious and non-infectious Republics do not come into contact, but the scavengers—the vultures—fly daily by the millions to and fro across the boundary. Unlike the starlings, these turkey-buzzards live almost entirely on carcases of animals, and on account of this it is illegal to destroy them. We can quite understand that Stockman and Garnett suggested that migratory birds might act as carriers of the disease, until someone could refute such supposition. Anybody suggesting that the virus of foot and mouth disease could be introduced in the marrow of chilled and frozen meat from abroad was ridiculed, until Professor Gofton, of Edinburgh, proved otherwise to the world.

We as a profession in Great Britain are somewhat conservative and hesitate to abandon old theories. In 1910 the first field trials were made in this country with extract of male shield fern to test its efficacy on liver fluke in sheep, which proved a success, *vide* V.J., 1918. I was pleased to learn how soon the sheep-farmers adopted this treatment, but was disappointed to find that the veterinary profession was slow in adopting this magnificant treatment which had already been used in France. This was several years before Dr. Hall, in the U.S.A., had been using carbon tetrachloride in treating distomatosis in cattle and sheep.

Your reference to "Atmospheric" in relation to diseases, would apply to braxy as a good example. This disease is very partial inasmuch as it affects the west coast of Scotland, Wales and Ireland, and several counties of England. The perior of heaviest rainfall in the braxy districts, the autumn, coincides with the periods of greatest incidence of braxy. On land which borders marshes and valleys braxy is more prevalent than on land of higher altitude. Hoarfrost is heavier and lasts longer down the valley than higher up on the hill, thus higher percentage of braxy in valleys.

Yours faithfully,
EDWARD MORGAN.

Hayes,
Kent.
May 17, 1943.

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